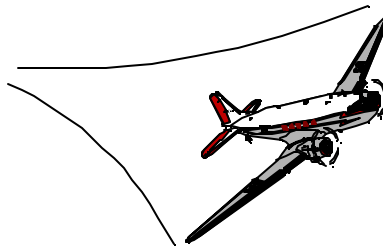


SPECIAL AIRWORTHINESS INFORMATION BULLETIN

Aircraft Certification Service
Washington, DC



U.S. Department
of Transportation

**Federal Aviation
Administration**

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We post SAIBs on the internet at "av-info.faa.gov"

This is information only. Recommendations are not mandatory.

Introduction

This Special Airworthiness Information Bulletin (SAIB) advises you, a registered owner of single and twin engine airplanes, of the need to check the condition of the vacuum or pressure system prior to each flight conducted in Instrument Meteorological Conditions (IMC) or under Instrument Flight Rules (IFR).

This SAIB is of interest to registered owners of small airplanes certificated under CAR 3 or 14 CFR Part 23 that have gyroscopic instruments which are powered by dual vacuum or pressure sources and have Airborne Check Valve Manifold or Check Valve Part Numbers 1H5, 1H24, or 1H37 installed.

Background

In a recent Cessna C335 accident, the pilot reported problems with a directional gyro. The airplane was flying in IMC and heavy weather. The check valves from the accident airplane were badly damaged in the crash and could not be evaluated. A subsequent review of the FAA Service Difficulty Reports (SDR) revealed that in the past 27 years, there have been 2,003 reports of vacuum system component failures. Many of these reported failures could cause similar problems encountered by the accident airplane. These reports include all service difficulties of the vacuum system. Eighteen of these reports occurred within the past 12 months.

One known item that could cause a problem in the vacuum or pressure systems is the Parker Hannifin check valves. There have been 13 failures of the applicable Parker Hannifin check valves reported in the past 22 years. Two of these reports were in year 2000.

Product Reference Memo Number 39 from Parker Hannifin (Airborne) denoted a potential latent failure of their check valves which could lead to a dual vacuum or pressure system failure. This Product Reference Memo states that the elastomeric flappers used in the check valves can deteriorate over time. This particular check valve is primarily used in airplanes equipped with two vacuum pumps. Failure of a check valve could allow a faulty vacuum or pressure source not to be isolated resulting in improper inflation of deice boots. In addition, the loss of the vacuum or pressure system can cause misleading information to be displayed to the pilot.

Recommendation

The FAA highly recommends that owners or operators **of airplanes with dual air sources that power attitude or directional gauges**, require the pilot to conduct a preflight **check to verify proper operation of the vacuum system**. This check can be accomplished at engine start up by separately starting each vacuum source, whether it is engine powered or powered by other means, and watching the vacuum gauges to verify proper operation. We recommend that you perform this check prior to each flight in IFR operations. The procedure should include the following steps:

- a. For most single engine airplanes equipped with dual air sources, turn on the auxiliary air pump. Verify the "AUX ON" light is illuminated and the pressure gage registers the pressure specified by the air pump manufacturer. Verify "GYRO OFF" light extinguishes.
- b. For most twin engine airplanes, start the left engine and run at the pneumatic system ground check rpm that is specified in the Pilots Operating Handbook. Verify "GYRO OFF" light extinguished and pressure gage registers the pressure specified by the air pump manufacturer. Verify "GYRO OFF" light extinguishes.
- c. Turn off auxiliary air pump (single engine). Shut down left engine (Twin engine).
- d. Start the engine (single engine). Start the right engine (twin engine). Run the engine at the pneumatic system ground check rpm that is specified in the Pilots Operating Handbook. Verify "GYRO OFF" light extinguished and pressure gage registers the pressure specified by the air pump manufacturer. Verify "GYRO OFF" light extinguishes.

Another option is to install a FAA approved backup attitude indicator. This installation should meet the following criteria :

- a. The backup indicator should be powered from a source independent of the electrical generating system;
- b. The system should provide reliable operation for a minimum of 30 minutes after total failure of the electrical generating system;
- c. The system should operate independently of any other attitude indicating system;
- d. The system should be operative without selection after total failure of the electrical generating system;
- e. The backup indicator should be located on the instrument panel in a position that will make it plainly visible to and usable by the pilot; and
- f. The backup indicator should be appropriately lighted during all phases of operation.

NOTE: The FAA is considering several options, including rulemaking action, to mandate these recommendations. **Operators/mechanics are requested to report any failures found pursuant to this SAIB to Roy Boffo, Chicago Aircraft Certification Office (ACO), roy.boffo@faa.gov.**

In addition, submit Malfunction or Defect Reports by accessing the FAA AFS-600 web page at <http://www.afs600.faa.gov>.

The FAA will continue to evaluate the results of failures/information reported from this SAIB and all other sources such as Aircraft Owners and Pilots Association (AOPA), Experimental Aircraft Association (EAA), and Type Clubs.

For Further Information Contact

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